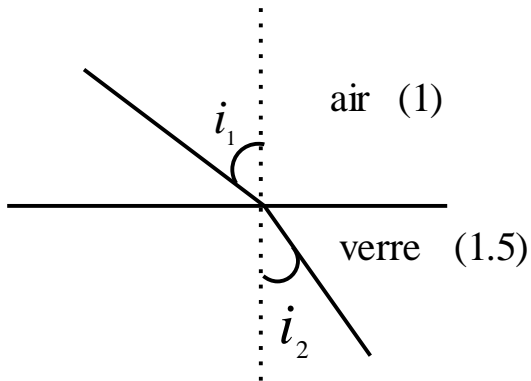


## Exercice 1

1/

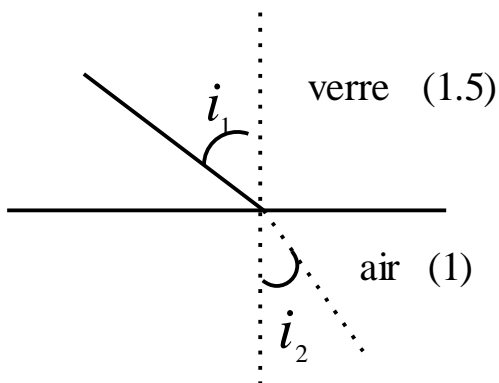


$$n_1 \sin i_1 = n_2 \sin i_2$$

$$i_{2\text{Limite}} = \arcsin\left(\frac{n_1}{n_2} \sin i_1\right) \quad \sin i_1 = 1$$

$$= \arcsin\left(\frac{n_1}{n_2}\right) = \arcsin\left(\frac{1}{1,5}\right) = 41,81^\circ$$

2/



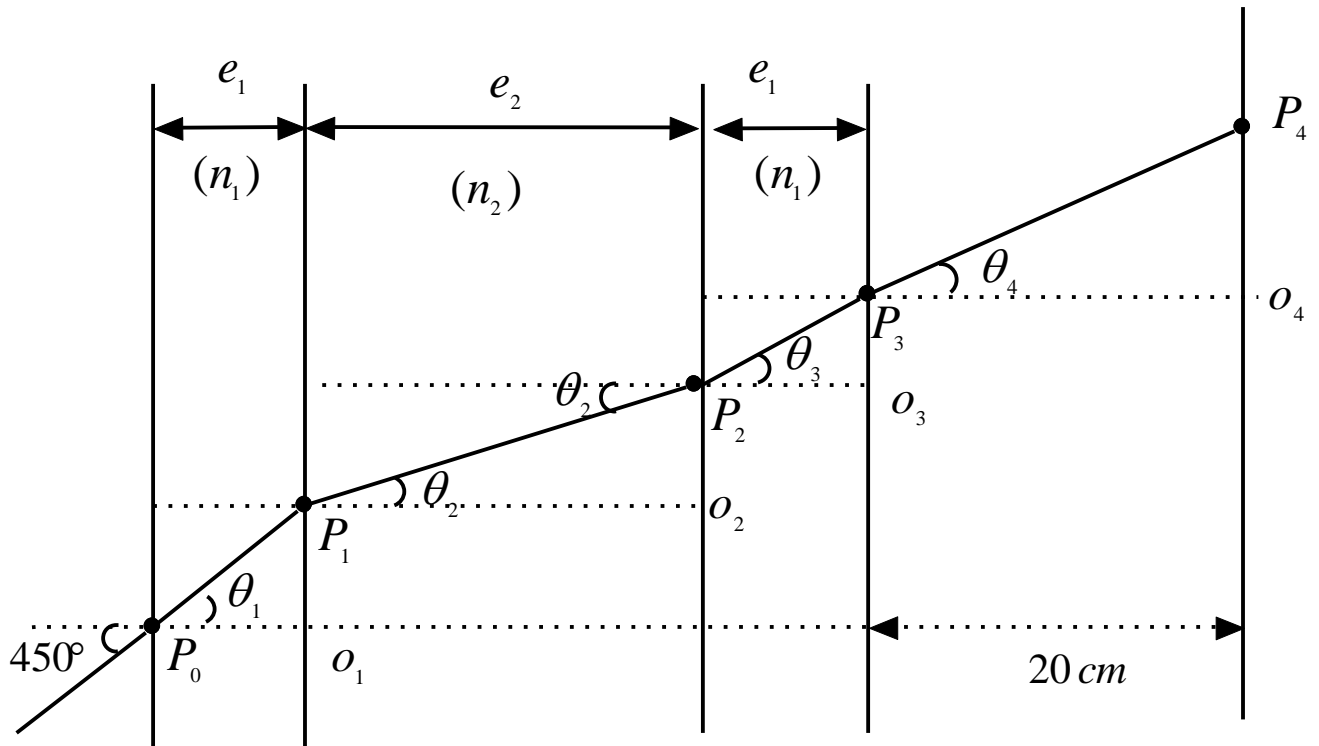
$$n_1 \sin i_1 = n_2 \sin i_2$$

$$\sin i_1 = \frac{n_2}{n_1} \sin i_2 \quad \Rightarrow \sin i_1 < \frac{n_2}{n_1}$$

$$i_{1\text{min}} = \arcsin\left(\frac{1}{1,5}\right) = 41,81^\circ$$

Au-delà de  $41,81^\circ$ , il y a réflexion totale dans le verre et les rayons ne passent plus dans l'air.

## Exercise 2



$$D = o_1 P_1 + o_2 P_2 + o_3 P_3 + o_4 P_4$$

AN:

$$D = 0,877 + 1,25 + 0,877\text{ cm} + 19,9\text{ cm}$$

$$D = 22,904\text{ cm}$$

## Exercise 3

1/

$$\text{en } I : \sin i = n \sin r$$

$$\text{en } I' : \sin i' = n \sin r'$$

$$2/ A = r + r'$$

$$3/ D = (i + i') - A$$

$$4/ \text{condition} = \frac{\cos r' \cos i}{\cos r \cos i'} = 1$$

$$D_m = 2i - A$$

## Exercise 4

$$\mathbf{1/ \text{ Réflexion totale } \Rightarrow \sin i \geq \frac{N}{n} \Rightarrow N \leq n \sin i}$$

AN =

$$N_{\max} = 1,29$$

2/ Angle limite  $\sin \theta_\ell = \frac{1}{1,5} \Rightarrow \theta_\ell = 41^\circ,8$

Comme  $\theta_\ell > 30^\circ \Rightarrow$  le rayon est alors transmis.

